

In the claims

The following is an amendment to and complete listing of the claims that replaces all prior listings of claims in the application.

1. (currently amended) An automated material handling and storage system for storage and shipping containers, the system comprising, a structure defining a plurality of vertical cells, each cell having a plurality of tier levels and being of a size to cooperatively receive a storage and shipping container at each tier level, a grid track system mounted in spaced relationship above said plurality of vertical cells and having a plurality of first pairs of parallel tracks extending transversely with respect to and intersecting with a plurality of second pairs of parallel tracks in an ~~intersecting~~ X-Y pattern and which first and second grid track system defines tracks define openings at each intersection thereof, at least one transfer unit moveably mounted to the said grid track system so as to be suspended therefrom, said at least one transfer unit including a plurality of carriage means for suspending said at least one transfer unit from said grid track system so as to be selectively moveable along a pair of said plurality of first pairs of parallel tracks for movement in a first longitudinal direction and being selectively moveable along a pair of said plurality of second

pairs of parallel tracks for movement in a second direction which is transverse to the first direction ~~spaced ones of said first and second tracks~~ above said plurality of cells, said at least one transfer unit including drive means for moving said at least one transfer unit along said grid track system so as to be moveable in a horizontal plane in both forward to back and side to side motions within the horizontal plane, a spreader beam, hoist means carried by said at least one transfer unit for raising and lowering said spreader beam, said spreader beam being of a size to cooperatively engage a storage and shipping container within one of said cells, at least one guide member extending between said spreader beam and said at least one transfer unit to stabilize said spreader beam with respect to said transfer unit to thereby control movement of a storage and shipping container carried by said spreader beam when the storage and shipping container is elevated above said plurality of cells, and means for providing electrical power to said drive means of said at least one transfer unit.

2. (canceled)

3. (currently amended) The automated material and handling and storage system of claim 1 in which said grid track system includes a plurality of rack members extending along each of

said first and second tracks of the system, said drive means including at least one first and second drive ~~[[motor]]~~ motors which ~~[[is]]~~ are powered by said means for providing electrical power to said drive means of said at least one transfer unit, said at least one first drive motor being drivingly connected to at least one first drive gear that is selectively engageable with said rack members of said first tracks and said at least one second drive motor being drivingly connected to at least one second drive gear that is selectively engageable with said rack members of said second tracks, and first means for selectively engaging and disengaging said at least one first drive gear with said rack members of said first tracks and second means for selectively engaging and disengaging said at least one second drive gear with said rack members of said second tracks

4. (canceled)

5. (currently amended) The automated material handling and storage system of claim ~~[[4]]~~ 3 wherein said at least one first drive gear is mounted to a first movable housing that is movable between a first position wherein said at least one first drive gear is spaced from said first rack members to a second position wherein said at least one first drive gear is in engagement with said first rack members, said at least one second drive gear

being mounted to a second movable housing that is movable between a first position wherein said at least one second drive gear is spaced from said second rack members to a second position wherein said at least one second drive gear is in engagement with said second rack members, and means to lock said first and second movable housings in said second positions thereof.

6.(currently amended) The automated material handling and storage system of claim 1 wherein each carriage assembly includes a plurality of roller elements mounted to a body, each body being of a size to be cooperatively received within an open channel defined by each of said first and second tracks of said grid track system, each of said carriages including a pilot shaft extending downwardly from said body and through said open channel defined in each of said first and second tracks of said grid track system, and means for connecting said pilot shafts to said at least one transfer unit to thereby support said at least one transfer unit in suspended relationship from said grid track system.

7.(previously presented) The automated material handling and storage system of claim 1 in which said at least one guide member includes at least one first guide member mounted to said at least one transfer unit and at least one second guide member

mounted to said spreader beam, one of said first and second guide members being a fixed probe and the other including a telescoping probe receiver of a configuration to cooperatively receive said probe so as to prevent swaying or rotational movement of said spreader beam with respect to said transfer unit.

8. (previously presented) The automated material handling and storage system of claim 7 including at least two hoist assemblies mounted to said at least one transfer unit for controlling movement of said spreader beam, each hoist assembly including a pair of winding drums for controlling cables connected to said spreader frame, and at least one hoist motor drivingly connected to each hoist assembly.

9. (currently amended) The automated material handling and storage system of claim 1 wherein said at least one transfer unit includes at least one first drive motor for driving said at least one transfer in a first direction along said first tracks and at least one second drive motor for driving said transfer units in a second direction along said second tracks.

10. (previously presented) The automated material handling and storage system of claim 5 wherein said at least one first drive motor drives a pair of first drive gears and said at least

one second drive motor drives a pair of second drive gears.

11. (previously presented) The automated material handling and storage system of claim 10 including guide means positioned between each of said pair of first and second drive gears for cooperatively guiding said pair of first and second drive gears relative to said first and second rack members, and said first and second rack members being placed on opposite sides of an open channel defined by said first and second tracks of said grid track system.

12. (currently amended) The automated material handling and storage system of claim 1 in which said means for providing energy includes ~~an inductive~~ a power raceway mounted adjacent said first and second tracks of said grid track system.

13. (previously presented) The automated material handling and storage system of claim 11 wherein each carriage assembly includes a plurality of roller elements mounted to a body, each body being of a size to be cooperatively received within a channel defined by each of said first and second tracks of said grid track system, each of said carriages including a pilot shaft extending downwardly from said body and through said open channel defined in each of said first and second tracks of said grid

track system, and means for connecting said pilot shafts to said at least one transfer unit to thereby support said at least one transfer unit in suspended relationship from said grid track system.

14.-17. (canceled)

18. (previously presented) The automated material handling and storage system of claim 7 wherein said at least one guide means includes a plurality of guide arms that extend downwardly from said at least one transfer unit for engaging said spreader beam as said spreader beam is raised above said plurality of cells.

19. (previously presented) The automated material handling and storage system of claim 18 wherein said guide arms are secured to said at least one transfer unit so as to engage with corners of said spreader beam, and each of said guide arms having two guide walls that are oriented approximately perpendicular relative to one another and which are flared outwardly at a lower portion thereof.

20. (previously presented) The automated material handling and storage system of claim 19 including two hoist assemblies

mounted to said at least one transfer unit, each hoist assembly including a pair of winding drums for controlling cables connected to said spreader frame, and at least one hoist motor drivingly connected to each hoist assembly.

21. (previously presented) The automated material handling and storage system of claim 1 including a plurality of transfer units operatively mounted to said grid track system.

22. (previously presented) The automated material handling and storage system of claim 1 wherein said drive means includes first drive members for engaging said spaced and parallel first track members and second drive members for engaging said spaced and parallel second track members, and at least one first motor drivingly connected to said first drive members and at least one second motor drivingly connected to said second drive members.

23. (previously presented) The automated material handling and storage system of claim 1 wherein said at least one guide means includes a plurality of guide arms that extend downwardly from said at least one transfer unit for engaging said spreader beam as said spreader beam is raised above said plurality of cells.

24.(currently amended) An automated material handling and storage system for storage and shipping containers within a hold of a vessel, the system comprising, a structure defining a plurality of vertical cells that are arranged in side by side and end to end relationship relative to one another within the hold of the vessel, each of said ~~[[cell]]~~ cells defining a plurality of tier levels and being of a size to cooperatively receive a storage and shipping container at a plurality of tier levels, a grid track system mounted in spaced relationship above all of said cells and having a plurality of first spaced and parallel tracks that intersect transversely with a plurality of second spaced parallel tracks in an intersecting pattern, at least one transfer unit moveably suspended from said grid track system so as to be selectively moveable along either pairs of spaced first tracks or pairs of spaced second tracks in an X-Y motion above said plurality of cells, said at least one transfer unit including a plurality of carriage means for suspending said at least one transfer unit from said grid track system, said at least one transfer unit including first drive means for moving said at least one transfer unit along said grid track system so as to be moveable in a horizontal plane in a forward to back motion and second drive means for moving in the horizontal plane in a side to side motion, a spreader beam, hoist means carried by said at least one transfer unit for raising and lowering said

spreader beam by way of cable elements controlled by said hoist means, said spreader beam being of a size to cooperatively engage a storage and shipping container within one of said cells, said grid track system being mounted above said cells at a vertical height to permit movement of said at least one transfer unit and said spreader beam to which a storage and shipping container is secured, and a plurality of deck plates mounted above said grid track system and means for providing electrical power to said at least one transfer unit.

25.(new) Then automated material handling and storage system for storage and shipping containers within a hold of a vessel of claim 24 including at least one first guide member extending from said spreader beam and cooperatively engaging at least one second guide member mounted to and extending from said at least one transfer unit, said first and second guide members being engageable with one another to stabilize said spreader beam with respect to said transfer unit to thereby control movement of a storage and shipping container carried by said spreader beam when the storage and shipping container is elevated above said plurality of cells.